REMARKS

Claims 1-52 are pending. Claims 1, 4, 6-9, 11-17, 20, 22-26, 31, 32, 35, 37-40, 43-47 and 52 have been amended to more clearly define the invention.

A unexecuted Declaration under 37 C.F.R. §1.132 by one of the inventors, Dr. Ben Chu, accompanies this Amendment. An executed declaration will follow shortly.

Present Invention

The present invention is directed to quasi-interpenetrating networks (quasi-IPNs) of polymer chains comprising linear polyacrylamide (LPA) chains and polydimethyl-acrylamide (PDMA) chains, or comprising acrylamide/dimethylacrylamide (AM/DMA) random copolymer chains and PDMA chains. The two different types of chains in these networks are entangled within one another and interpenetrate one another. That is, one type of network interpenetrates the other type of network. However, unlike prior art interpenetrating networks, the quasi-IPNs have substantially no chemical cross-linking. (See specification page 12, lines 1-7.) These networks are used for separating charged molecular species.

Particular production methods are necessary to make these quasi-IPNs. Independent Claims 1 and 32 recite one of these production methods, *i.e.*, the "main frame" method. In this method, a polymer network or "main frame" is formed from LPA or from AM/DMA. Next, PDMA is polymerized within the main frame. (See specification page 15, line 29, to page 23, line 10, and Claims 1-21, 29, 30, 32-42, and 50-51.)

Claims 22 and 43 recite the "solution mixing" method. In this method, separate solutions of LPA and PDMA are provided. One of these solutions is significantly more dilute than the other solution. The more dilute solution is added to the other solution in a

stepwise fashion. After each addition, the resultant solution is thoroughly mixed, permitting the polymer chains to interpenetrate. (See specification page 23, line 11, to page 26, line 11, and Claims 22-28, 29, 31, 43-50 and 52.)

Claim 13 recites a structural novelty of these quasi-IPNs, *i.e.*, the interpenetration of the first polymer network within the second polymer network. Claims 29 and 50 recite a method of separating charged molecular species using quasi-IPNs.

Rejection under 35 U.S.C. §103(a)

Claims 1-52 are rejected under 35 U.S.C. §103(a) as being obvious over Voss *et al.* (U.S. Patent No. 6,706,162). (See Office Action paragraph bridging pages 2 and 3.) According to the Examiner, Voss *et al.* disclose a composition comprising a non-crosslinked acrylamide polymer having a high molecular weight and a surface interaction component. The Examiner indicates that the acrylamide polymer could be LPA, and the surface interaction component could be PDMA.

Although not disclosed, the Examiner alleges that "[i]nterpenetrating network having entangled property would be inherent in Voss invention since Voss discloses a surface interaction between a non-crosslinked polyacrylamide and a polydimethyl-acrylamide." (Office Action page 2, paragraph 2.) This allegation is incorrect.

Contrary to the Examiner's assertion, the two different types of polymer chains of Voss *et al.* do **not** entangle and interpenetrate each other as do the two different types of polymer chains of the present invention.

In order to achieve the polymer chain entanglement and interpenetration, the networks of the present invention are prepared by particular methods as described in the specification. Such methods are not disclosed by Voss *et al.*

The methods by which to produce these quasi-IPNs include the "main frame" method, and the "solution mixing" method.

Due to the particular production methods, the polymer chains of the quasi-IPNs have particular structural characteristics. For example, the two different types of polymer chains interpenetrate one another. (See 1.132 Declaration, paragraph 4.) Also, the polymer chains of the quasi-IPNs have an extended formation. That is, the quasi-IPNs have a lower weight to volume ratio than the combined weight to volume ratios of the quasi-IPNs' constituent polymers. (See page 13, lines 20-27, of the specification and 1.132 Declaration, paragraph 8.) Additionally, the concentration of *each* polymer in the quasi-IPN is **above** its own overlap concentration. (See page 20, lines 19-22, of the specification and 1.132 Declaration, paragraph 9.)

The methods of the present invention are not disclosed by Voss *et al.* Consequently, the polymers structures of the present invention are also not disclosed in Voss *et al.*

In the Voss *et al.* method, a non-crosslinked acrylamide polymer is first formed. Then, a second polymer is simply added to the acrylamide polymer. This second polymer is **not** polymerized within the acrylamide polymer. The second polymer is simply dispersed among the chains of the acrylamide polymer. As a result, Voss *et al.* disclose forming a *mixture* of polymers. (See 1.132 Declaration, paragraph 13.)

The quasi-interpenetrating networks of the present invention can **not** be prepared by the methods described in Voss *et al.* The polymer compositions disclosed by Voss *et al.* have different physical characteristics than the quasi-IPNs. For example, the two different types of polymer chains of the compositions of Voss *et al.* do **not** interpenetrate each other. Also, the polymer compositions of *Voss et al.* do **not** have the extended formation of the structures of the present invention. Additionally, the second polymer used in the Voss *et al.* compositions is **below** its overlap concentration. (See 1.132 Declaration, paragraphs 14-16.)

The structural differences between the quasi-IPNs of the present invention and the Voss *et al.* composition are summarized in the below table.

Property	**Quasi-IPNs**	**Voss *et al.***
Interpenetration of different polymer types	Yes	No
Extended polymer formation	Yes	No
Both polymers above own overlap concentration	Yes	No

Thus, Voss *et al.* clearly do not teach or suggest all the limitations of the present claims. In particular, independent Claims 1 and 32 recite "polymerizing" the second polymer within the "main frame" polymer. Voss *et al.* does not teach or suggest polymerizing the second polymer with a main frame.

Independent Claims 22 and 43 recite the "solution mixing" method. Voss *et al.* does not teach or suggest such a "solution mixing" method.

Independent Claim 13 recites the structural novelty of these quasi-IPNs, *i.e.*, the interpenetration of the first polymer network within the second polymer network. The Voss *et al.* compositions do not have such an interpenetration.

Independent Claims 29 and 50 recite a method of separating charged molecular species using quasi-IPNs. The Voss *et al.* compositions are not quasi-IPNs.

Moreover, Voss *et al.* state that their compositions provide "high speed, high resolution of analytes by capillary electrophoresis" (see abstract). Accordingly, Voss *et al.* do not provide motivation to improve (*i.e.*, modify) their teachings to form the quasi-interpenetrating structures of present invention. Thus, a *prima facie* case of obviousness has not been made in view of Voss *et al.*

However, even if a *prima facie* case of obviousness would have been made, it would have been overcome by the unexpectedly superior results obtained by the present invention. As stated by Dr. Chu in the accompanying declaration, the quasi-IPNs of the present invention provide superior separation results *vis-à-vis* the compositions described by Voss *et al.* For example, according to Dr. Chu:

> A first and second polymer in the form of the quasi-IPNs provide unexpectedly superior separation results *vis-à-vis* the same first and second polymer in the form described by Voss *et al.* Due to the more efficient network structure, the quality of separation results is significantly improved. For example, the quasi-IPNs allow for a shorter run time and better resolution than do the compositions of Voss *et al.* (37 CFR §1.132 Declaration paragraph 17).

Applicants respectfully request withdrawal of this obviousness rejection.

Rejections in view of U.S. Patent No. 6,770,698

The Examiner has rejected Claims 1-52 under the judicially created doctrine of obvious type double patenting in view of U.S. Patent No. 6,770,698. (See Office Action pages 3-4, paragraphs 3-4.) The Examiner indicates that the filing of a terminal disclaimer may be used to overcome this rejection.

The Examiner has also rejected Claims 1-52 as being obvious over U.S. Patent No. 6,770,698. (See Office Action pages 4-5, paragraphs 5-7.) The Examiner indicates that the filing of an oath or declaration under 37 CFR § 1.130 stating that the application and the prior art reference are commonly owned, and the filing of a terminal disclaimer may be used to overcome this rejection.

In response to these rejections, a terminal disclaimer in compliance with 37 CFR §1.321(c) is submitted herewith. Also, a statement of common ownership follows.

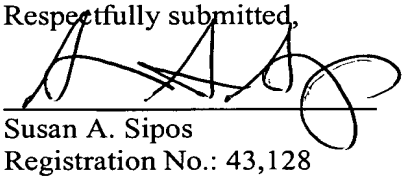
STATEMENT OF COMMON OWNERSHIP

The present application, U.S. Serial No. 10/671,335, and U.S. Patent No. 6,770,698 are currently, and were at the time the present invention was made, owned by The Research Foundation of State University of New York, Albany, NY.

Accordingly, the obvious type double patenting rejection and obvious rejection in view of U.S. Patent No. 6,770,698 have been overcome.

Applicants respectfully submit that the application is now in condition for allowance, which action is earnestly solicited. If resolution of any remaining issue is required prior to allowance of this application, it is respectfully requested that the Examiner contact Applicants' undersigned attorney at the telephone number provided below.

Respectfully submitted,



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